Chattogram Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2ⁿᵈ Year 1ˢᵗ Semester Final Examination 2019
Course Title: Organic Chemistry (Theory)
Course Code: OCM-201

Full Marks: 70 **Time: 3 hours**

(Figures in the right margin indicate full marks. **Answer any three (4) questions** from each section of which question number **1 and 6 are compulsory.** Use separate answer script for each section. **Split answer is strongly discouraged.**)

SECTION-A

1. a) What do you understand by the term "Electron Delocalization'? 2
    b) With suitable example briefly classify organic compounds according to structure. 3

2. a) What kind of hybridization does occur in case of alkane compounds? Discuss about the structure of alkane. 4
    b) Briefly discuss "Catalytic Cracking Reaction" with mechanism. 4
    c) Explain why alkanes are relatively unreactive. 2

3. a) Defend the statement, "Alkynes are more acidic than that of corresponding alkenes and alkanes." 3
    b) Classify monohydric alcohols. 2
    c) Predict what happens when alcohol is treated with sulphuric acid at different density and temperature. 5

4. a) What are aromatic compounds? Evaluate coal as a source of aromatic compounds. 4
    b) State Huckle Rule. Write the structure of two compounds that follow this rule. 3
    c) Explain basicity of amines and acidity of phenols. 3

5. Write down the following reactions: 2.5X4=10
    i) Aldol condensation
    ii) Cannizaro reaction
    iii) Fridel Craft Acylation
    iv) Gatterman reaction

SECTION-B

6. a) Define organic chemistry. Why is organic chemistry so important? 2.5
    b|) Why is organic chemistry a separate discipline? 2.5

7. a) Define saturated and unsaturated hydrocarbon with suitable example. 3
    b) What is peroxide effect? Describe it with mechanism. 4
    c) Recall "Bayer Test" for carbon carbon double bond identification. 3

8. a) Outline oxonium salt formation from ether. 3
    b) Discuss "Williamson Ether Synthesis". 2
    c) Illustrate neocleophilic addition reaction of carbonyl compounds. 5

9. a) "Although benzene has double bond in its structure, it does not give addition reaction instead undergo electrophilic substitution reaction" –Justify the statement. 4
    b) Why do lower alcohols are more soluble in water than higher alcohols? 2
    c) How does ether form from carbohydrate? Explain with mechanism. 4

10. Write down the reactions involving following transformation: 2.5X4=10
    i) Benzene from propene
    ii) Acetaldehyde from formaldehyde
    iii) Styrene from benzene
    iv) Phenol from nitrobenzene

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination, 2019
Subject: Applied Nutrition (Theory)
Course Code: APN-201(T)

Full Marks: 70   Time: 3 hours

(Figures in the right margin indicate full marks. Answers any **5** questions from each section where question no 1 and 7 are compulsory. Split answer is strongly discouraged.)

Section-A

1 a. What do you mean by nutritional status?   2
  b. How do you assess nutritional status of a community during emergency situation?   5

2 a. What is PEM? Differentiate between Kwashiorkor and Marasmus.   3
  b. Point out the clinical signs and characteristics features of Kwashiorkor and Marasmus.   4

3 a. Define bio-fortification.   2
  b. Briefly discuss on dietary assessment Techniques.   5

4 a. Explain complementary food supplements in detail.   5
  b. What kind of food-based approaches are used to prevent micronutrient deficiencies in developing countries?   2

5 a. What steps should be followed for ensuring fair distribution of general dry ration?   3
  b. Organize a therapeutic feeding program for the management of PEM.   4

6 a. Define nutrition education. Write down the role of community nutritionist in nutrition education.   3
  b. Discuss on five stages of nutrition transition as the food environment.   4

Section B

7 a. What is food fortification? What are the basic requirements for successful food fortification program?   4
  b. Differentiate between food fortification and food enrichment method   3

8 a. A child of 3 years old is suffering from malnutrition in Cox's bazar refugee camp. How will you assess his nutritional status?   3
  b. Illustrate a framework for understanding the causes of nutrition transition.   4

9 a. What kind of special foods are used during emergencies?   5
  b. Why freeze-dried foods are inappropriate for emergency feeding?   2

10 a. Differentiate between media and method.   2
  b. What is nutrition communication? Explain the methods of nutrition communication.   5

11 a. Interpret a decision chart for the implementation of selective feeding program.   5
  b. Summarize feeding program strategy.   2

12   Write short note on the followings-(Any two)   3.5×2=7
    i. Double burden problem
    ii. Food hygiene and sanitation
    iii. Role of mass media to combat nutritional problem

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2ⁿᵈ year 1ˢᵗ Semester Final Examination 2019
Subject: Technology of Food Preservation (Theory)
Course Code: TFP-201 (T)

Full Marks: 70   Time: 3 hours

(Figures in the right margin indicate full marks. Answer any four questions from each section where question no. 1 and 6 are compulsory. Use separate answer script for each section. Split answer is not allowed.)

Section-A

1. What do you mean by food processing and preservation? Write down the principles of food preservation. 2+3=5

2. a) Analyze and describe the plant product storage techniques. 5
    b) Discuss the factors affecting fruit and vegetable quality. 5

3. a) Illustrate the principles of freezing by a characteristics freezing curve. Distinguish between refrigerated storage and freezer storage. 3+2=5
    b) Demonstrate a freeze dryer with a neat diagram and its applications in food processing. 5

4. a) Draw and label different types of spray driers. 3
    b) Write a short note on use of nitrites in food preservation. 4
    c) Briefly describe the principles of chemical preservation. 3

5. a) What are the roles of container in food canning? "The glass package has a modern profile with distinct advantages."- Explain the concept. 5
    b) Briefly describe the mechanism of natural preservation methods of foods. 5

Section-B

6. What do you mean by quality of food? Describe the quality attributes of food. 2+3=5

7. a) Explain the process of dehydration of fruits and vegetables. 5
    b) Discuss how you can perform reconstitution test. 2
    c) If the drained weight of 23 g dried sample containing 7% moisture after rehydration is 78 g and the fresh sample before drying contained 86% moisture then calculate the rehydration co-efficient. 3

8. a) Explain Newtonian and Non-Newtonian fluids with figure. 4
    b) Compare Einstein equation, Guth and Simha and Manley and Manson equation when predicting the viscosity of a 12% by volume slurry and a 23% by volume suspension. The viscosity of the liquid suspending medium is 1.3×10^{-3} lbm/ft-sec. 4
    c) Define angle of repose and angle of slide. 2

9. a) Define food irradiation. Briefly describe the irradiation processes. 1+4=5
    b) Appraise potential application of food irradiation. Write down the criteria of an irradiation plant. 4+1=5

10. a) Enumerate the differences between conventional and freeze drying. 3
    b) Define food texture. Describe the response of a food product to cyclic force application. 1+4=5
    c) Classify defects of food. 2

Chattogram Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd Year 1st Semester Final Examination 2019
Course Title: General Microbiology (Theory)
Course Code: GMC-201

Full Marks: 70   Time: 3 hours

(Figures in the right margin indicate full marks. **Answer any three (3) questions** from each section of which question number **1 and 5 are compulsory**. Use separate answer script for each section. **Split answer is strongly discouraged**.)

SECTION-A

1. a) Identify the contributions to Microbiology made by Antony Van Leeuwenhoek, Louis Pasteur, Robert Koch and Alexander Fleming. 4
    b) Draw a bacterial cell and label all important structures. 4
    c) Classify bacteria on the basis of location of endospore. 3

2   a) Enumerate different types of physical methods used to control microbial growth. 2
    b) How do pH and temperature influence the growth of bacteria? 5
    c) What do you mean by pathogenicity and virulence? Write down the pathogenic properties of bacteria. 2+3

3. a) Describe some molds with their industrial importance. 4
    b) Differentiate between bacteria and fungi. 3
    c) Describe the criteria that are important for mold identification. 5

4. a) Define genome, codon and anticodon. 3
    b) Define mutation and genetic recombination. Explain the transformation process occur in bacteria. 2+4
    c) Compare and contrast DNA and RNA. 3

SECTION-B

5. a) What are the major structural differences between Gram-positive and Gram-negative bacterial cell walls? 3
    b) Describe the structure and function of the glycocalyx. 4
    c) State the importance of bacterial endospore and briefly describe the process of bacterial endospore formation. 4

6. a) Explain the relationships between nutrition, metabolism and growth. 4
    b) Write down the structure and function of the bacterial appendage that provides motility. 3
    c) Describe how pure cultures can be isolated by using the streak pate method. 5

7. a) What is virion? Briefly describe the viral structure. 5
    b) Explain general characteristics of virus. 4
    c) How do viruses differ from other organisms? 3

8. a) State the distinguishing features of yeasts and molds. 4
    b) What are the asexual and sexual spores produced by fungi? 4
    c) Briefly explain the stages in the development of chlamydial forms in host cells. 4

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
B.FST 2nd year 1st Semester Final Examination 2019
Subject: Unit Operations in Food Processing (Theory)
Course Code: UFP-201 (T)

Full Marks: 70   Time: 3 hours

(Figures in the right màrgin indicate full marks. Answer any four questions from each section where question no. 1 and 6 are compulsory. Use separate answer script for each section. Split answer is not allowed.)

Section-A

1.   Differentiate unit process and unit operation. How do you classify various unit operations?   1+4=5

2. a) State and explain the first and second law of thermodynamics.   3
    b) Make the following conversation: 1.5+1.5=3
        i.   75.75 ft^{3}lbf/in^2.lb.mol°R to J/kg.mol.k
        ii.   102 BTU/h.ft^2.°F to KW/m^2.°C
    c) Potato flakes (M$_{c(wb)}$=75%) are being dried in a drier. The moisture content of the air entering the drier is 0.1 kg water per kg of dry air. The moisture content of air leaving the drier is 0.2 kg water per kg of dry air. The air flow rate in the drier is looking dry air per hour is 50 kg of wet potato flakes enter the drier per hour at steady state. Calculate-   4
        i.   What is the mass flow rate of dried potato?
        ii.   What is the moisture content and dry basis of dried potatoes existing drier?

3. a) Differentiate between conventional drying and freeze drying process.   2

    b) Show how temperature influences on drying rate constant.   3
    c) Potatoes with 73% moisture content is being dried in a cabinet drier at 78 °C and 9% relative humidity under the drying condition equilibrium moisture content is assumed to be 1% moisture content (dry basis). The experimental data are: 5

% M$_c$ (db)	Time
330	0.5
220	0.5
51	1.5
50	1.5
43	3.5
37	4

Now determine the drying rate constant and diffusion co-efficient when slab thickness is 5 mm.

4. a) A conventional liquid coffee is being freeze dried by placing a 10 cm thick frozen layer of the product over a heated plate. The product is frozen to -75 °C initially and before placing over the 30 °C plate. The freeze-drying is accomplished in a chamber at a pressure of 38.11 Pa with a condenser temperature of -65 °C. Properties needed to describe the process have been measured in an experimental system; mass diffusivity 2x10^{-3}m^2/s and mass transfer co-efficient 1.5 kg mole/s.m^{2}Pa. The initial moisture content of the concentrate is 40% and the density of the dry product solids is 1400 kg/m^3. Compute the drying time for the product. [Universal gas constant 831.41 m^{3}Pa/kg.mole.K; Absolute temperature 243 K at 38.11 Pa; Vapor pressure of condenser surface 0.5 Pa]   5
    b) Draw a schematic illustration of a fluidized bed dryer. Explain the quality changes during drying of food product.   2+3=5

5. a) Define water activity.   1

    b) Why water activity is important for food in perspective of food science?   3

    c) What is hysteresis? Describe the state of water in food in terms of sorption   1+2=3
        isotherm.

    d) Briefly explain the concept of glass transition and glass transition   3
        temperature in food preservation.

Section-B

6.   Explain plank's equation for predicting freezing time of infinite slab   5
        geometry.

7. a) Explain the mechanism of freezing. How does quick freezing improve the   2+2=4
        quality of frozen product in comparison to slow freezing?

    b) An IQF tunnel is being used for freezing of strawberries (size 0.5 inch) with   6
        density 60 lbm/ft^3. The product conveyor is 10 ft wide and 25 ft long. The
        air used as freezing medium is at -30 °F and moves through the product bed
        at a velocity which produces a surface heat transfer co-efficient of 55
        BTU/hr.ft^2.°F. If the strawberries enter the tunnel at 60 °F and are frozen to 0
        °F; latent heat 1.2 BTU/ hr.ft.°F, compute the conveyor velocity and estimate
        the capacity of the freezer.

8. a) How evaporation is differentiate from distillation and drying? Describe a   2+2=4
        rising film evaporation system with neat diagram.

    b) A single effect evaporator is being used to concentrate 10,000 kg/h of   6
        pineapple juice from 5% total solids to 30% total solids. The juice enters the
        evaporator at 15 °C. The evaporator is operated with steam at 143.27 KPa.
        The vacuum inside the evaporator allows the juice to boil at 75 °C.
        Calculate-
        i.   Steam requirements
        ii. Steam economy of the process.
        Assume the condensate is being discharged at 75 °C. The specific heat of the
        liquid feed and the concentrated product is 4.1 kj/kg.°C and 3.1 kj/kg.°C
        respectively. Enthalpy for saturated vapor at 143.27 KPa (110 °C) is 461.30
        kj/kg. Enthalpy for saturated vapor at 75 °C is 2635.3 kj/kg.

9. a) Briefly explain the mode of heat transfer in food processing.   5

    b) Write down the thermal properties of food. A cold storage wall (6m X 9m) is   1+4=5
        constructed of 25 cm thick concrete (Thermal conductivity 1.37 w/m°C).
        Insulation must be provided to maintain a heat transfer rate through the wall
        at or below 750 w. If the thermal conductivity of the insulation is 0.04
        w/m°C. Compute the required thickness of the insulation. The outside
        surface and inside wall temperature are 48 °C and 5°C respectively.

10. a) Write down the short notes of any of the following four: 2.5x4=10
        i.   Plate heat exchanger
        ii. Immersion freezing
        iii. Mean freezing temperature
        iv. Fluidized bed drier
        v.   Drum dryer

Chittagong Veterinary and Animal Sciences University
Faculty of Food Science and Technology
BFST 2nd year 1st Semester Final Examination 2019
Subject: Basic Electrical & Electronics Engineering (Theory)
Course Code: EEE-201(T)

Full Marks: 70.0   Time: 3 hours

(Figures in the right margin indicate full mark. Answer any 5 (Five) questions from each section. Use separate answer script for each section. **Split answer is strongly discouraged**.)

Section-A

1. a) Define Resistance, Reactance and Impedance.   1
   b) Differentiate between series resonance and parallel resonance.   2
   c) Combine the series voltage sources in Fig.1 (a) and (b) into single voltage   4
      source.
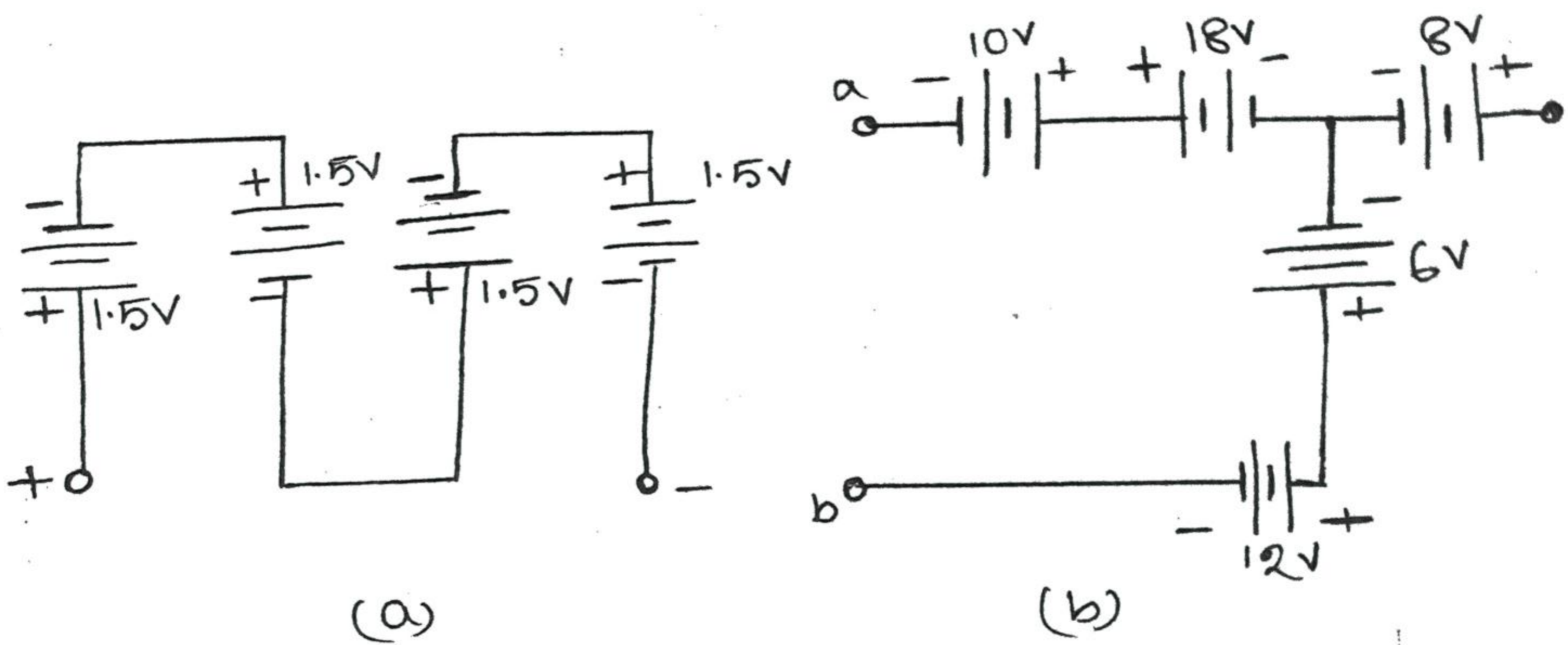
Figure: 1

2. a) How could you convert an intrinsic semiconductor into a p-type   4
      semiconductor? Explain. Hence give the concept about hole type conductivity.
   b) Draw and analyze the V-I characteristics of pn junction.   3

3. a) What are the factors on which the resistance of a conductor depends?   2
   b) Referring to Fig.2   5
      i)   Determine V_2 by simply noting that $R_2 = 3R_1$
      ii) Calculte V_3.
      iii) Noting the magnitude of V_3 compared to V_2 and V_1, determine R_3 by inspection.
      iv) Calculate the source current I.
      v)   Calculate the resistance R_3 using Ohm's law and compared it to the result of part (iii).
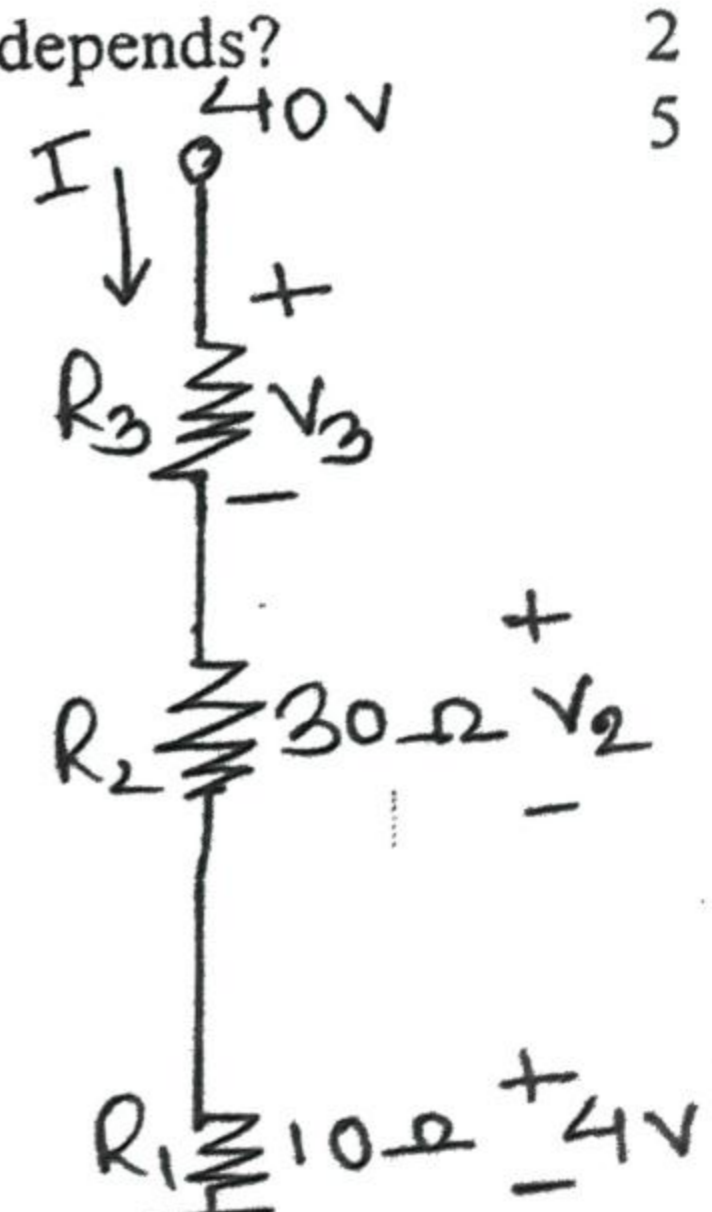

Figure: 2

4. a) What value of series resistor is required to limit the current through a LED to 2
      20mA with a forward voltage drop of 1.6V when connected to a 10V supply?
   b) Explain the operation of (i) photo diode and (ii) tunnel diode.   5

5. a) State Kirchhoff's Voltage Law (KVL) with example.   2
   b) Using Kirchhoff's Current law, determine the unknown currents for the   5
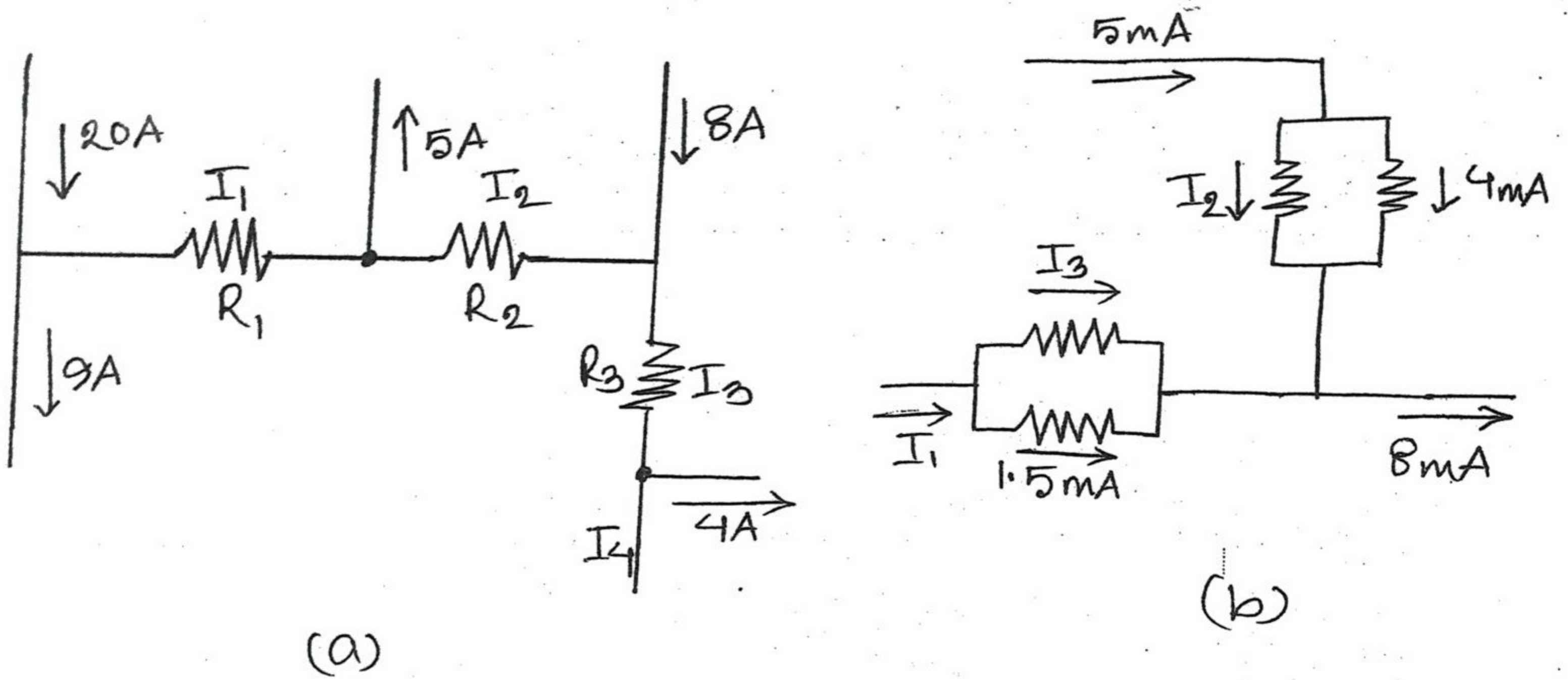   networks of Fig.3 (a) and (b).

Figure: 3

6. a) Discuss how a BJT is used as a voltage amplifier.   5
    b) What are the basic differences between JFET and BJT?   2

Section-B

7. a) Draw and explain Hysteresis curve. Hence define 'retentivity' and 'coercive 5
    force' with all necessary diagrams.
    b) Write short notes on: 2
       i) Reluctance and ii) Relative permeability.

8. a) Why do insulators not have any free electrons?   2
    b) What do you understand by constant voltage source and constant current   2
    source?
    c) How do you convert a constant voltage source into a constant current source   3
    and vice versa?

9. a) Determine the current I in the circuit shown in Fig.4 Assume the diodes to be   3
    of silicon and forward resistance of diodes to be zero.
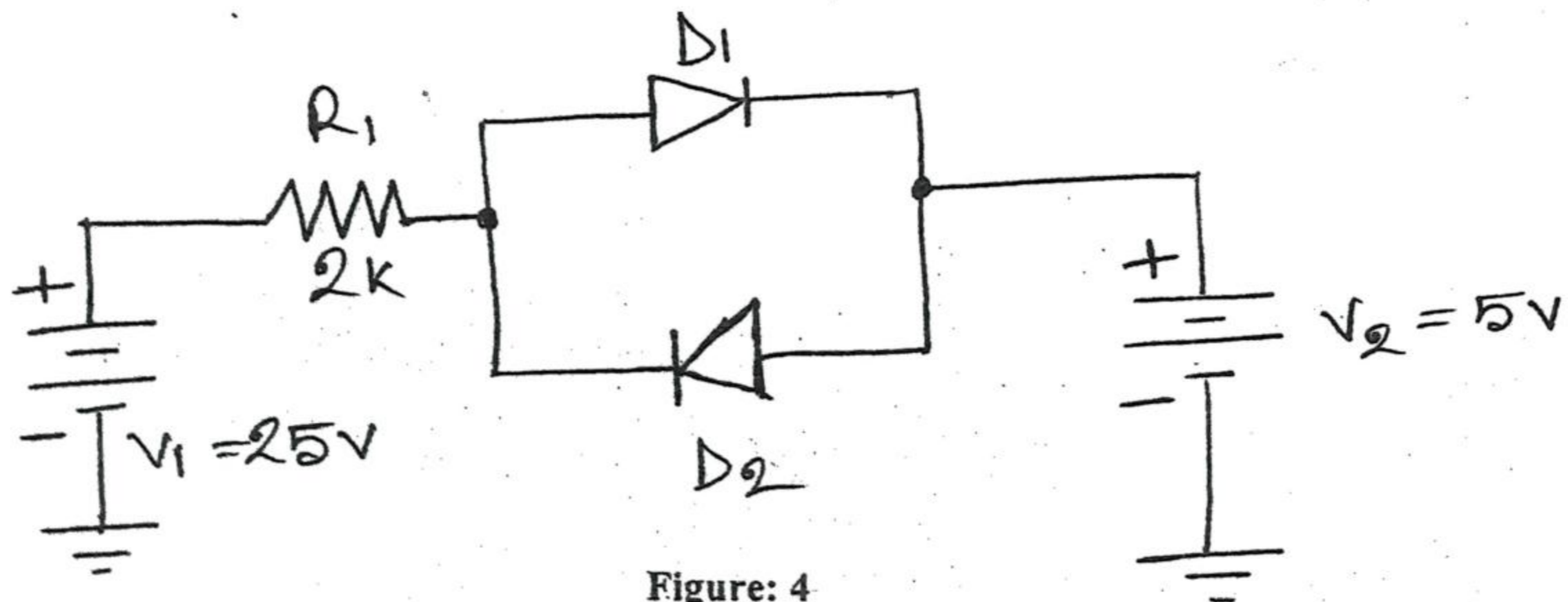

Figure: 4

    b) For the circuit shown in Fig.5 find   4
       i) the output voltage.
       ii) the voltage drop across series resistance and
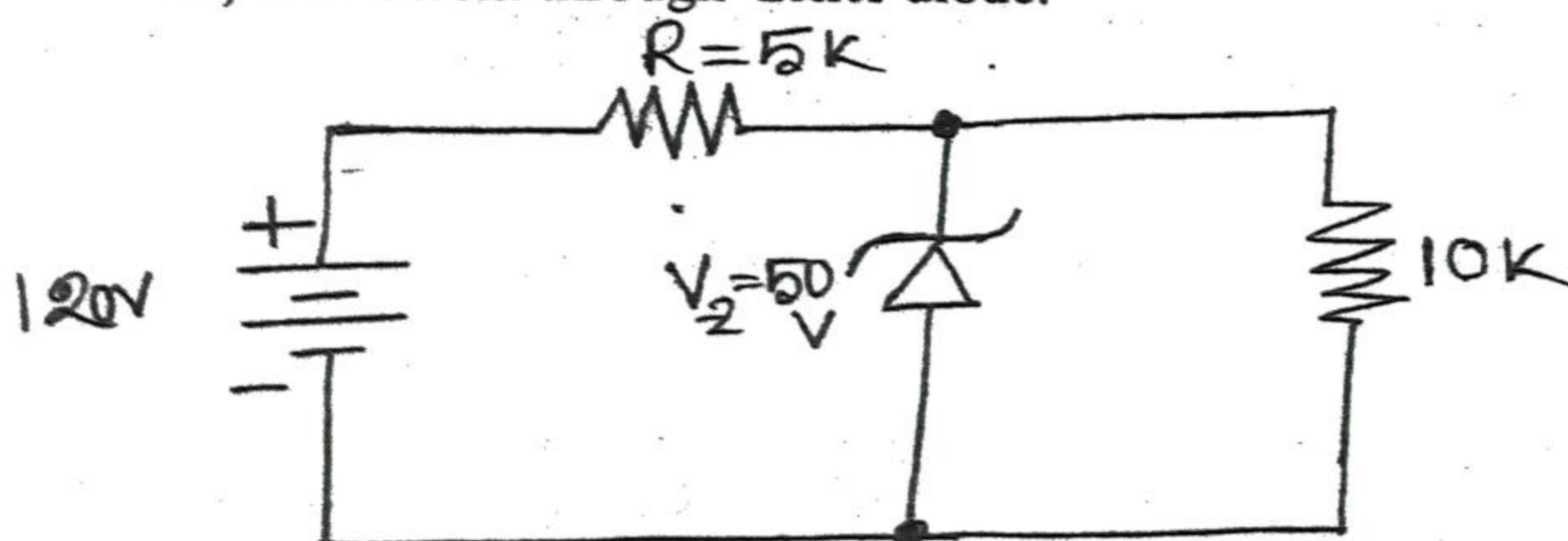   iii) the current through zener diode.

Figure: 5

10. a) What is the difference between break down voltage and peak inverse voltage? 2
   b) With a neat sketch, explain the working principle of Full-wave bridge 5
      rectifier.

11. a) Using the Superposition theorem, determine the current through resistor R_2 in 3
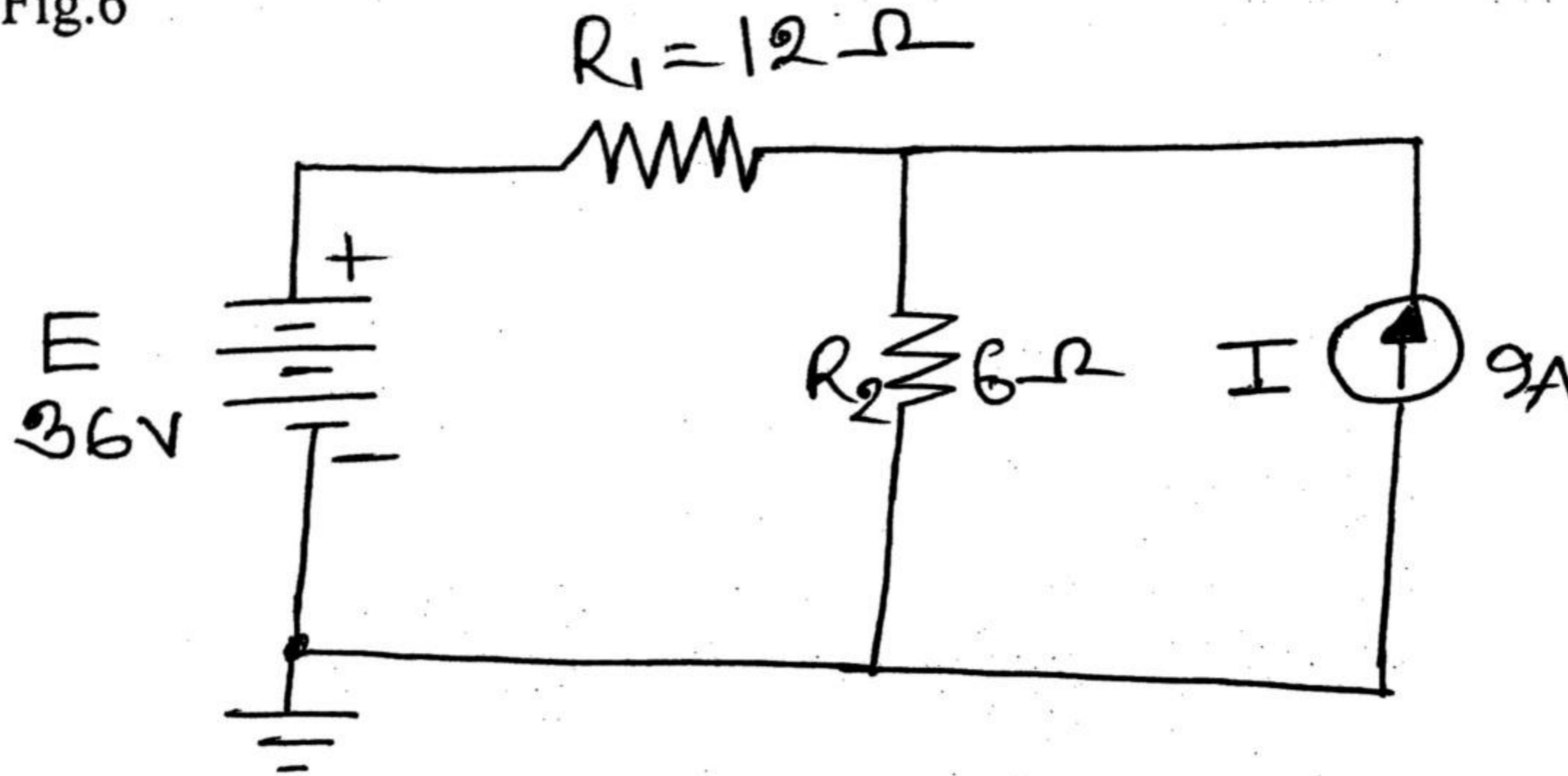   the Fig.6

$$R_1 = 12\ \Omega$$

Figure: 6

   b) Using the Superposition theorem, determine the current through resitor R_2 in 4
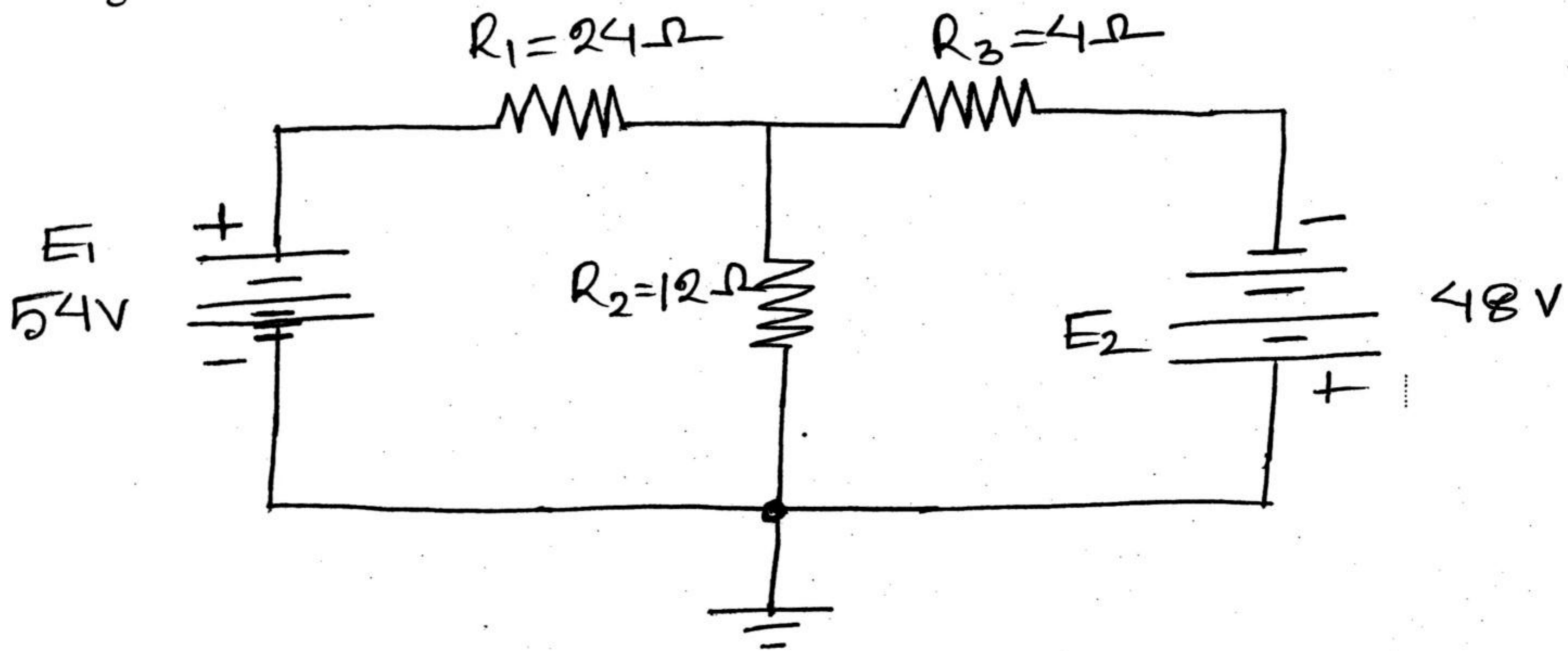   Fig.7

Figure: 7

12. a) Why the E-MOSFET operates only in the enhancement mode and has no 5
      depletion mode? Hence explain how a channel is created in E-MOSFET.
   b) Sketch basic structure of n-channel and p-channel D-MOSFET. 2